

Medical History

Orthopaedic Surgery in World War II: Military and Medical Role of Northern Ireland

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INTRODUCTION

Belfast, Boston Massachusetts, Oswestry Shropshire and Oxford were the sites of publications on the regionalisation of Orthopaedic Surgery centres which have led to our present trauma centres. Professors Andrew Fullerton and Thomas Sinclair of Queen's Belfast were under the Allied Command of Sir Alfred Keough, head of the RAMC who appointed Robert Jones of Oswestry as Commander of Allied Orthopaedics for World War I. Both Jones and Keough established orthopaedic regional centres and orthopaedic hospitals in England, France and Scotland. In total, they comprised 30,000 beds. Jones also treated as patients and trained as surgeons: Harry Platt, Gathorne Robert Girdlestone, Henry Osmond Clark and Reginald Watson-Jones, who were later to become prominent consulting professorial orthopaedic surgeons.

INTERVAL BETWEEN WORLD WAR I AND WORLD WAR II

Realising that 70% of Allied World War I war wounds involved bone injuries^{1,2}, Professor Lord Moynihan, Leeds and Professor Gerald Gask, Barts, agreed that a committee should be set up to consider all aspects of orthopaedic staffing and equipment³. This committee first met at Bath during August 1925 under the auspices of the British Medical Association (BMA). Later, the BMA, the RAMC and the British Orthopaedic Association informed the American Orthopaedic Association that the regionalisation of Orthopaedics instituted by Generals Sir Robert Jones and Sir Alfred Keough would be continued as British policy.^{1,3,4} The results were superior when regionalisation had been deployed.³

Five months before Hitler gained power in Germany, Professor and Mrs. Gathorne Robert Girdlestone were invited to Harvard, New York and Baltimore and to address the American Orthopaedic Association⁵. Both spoke. Professor Girdlestone was "the great missionary of regional orthopaedics with its central orthopaedic hospital, satellite clinics and unified staff" and "the hospital was an extension of... home life which was made idyllically happy by his wife Ina."⁶ Professor and Mrs. Girdlestone discussed and delineated Orthopaedic regionalisation and planning at Harvard University for a week, and then with Massachusetts General Hospital staff and Harvard students.

The Girdlestons continued on to New York and Baltimore, back to Boston, thence to Buffalo, NY and Toronto, where the American Orthopaedic Association was meeting.

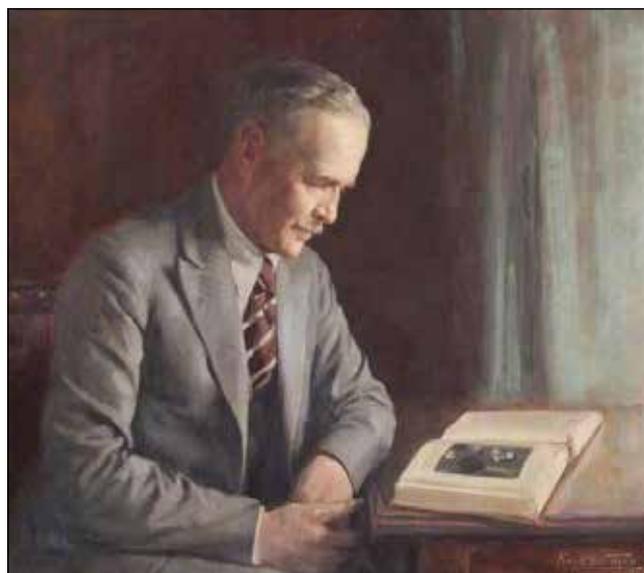


Fig 1. Gathorne Robert Girdlestone (1881-1950), oil on canvas, 29.5" by 24.5", by Frank S. Eastman (1878-1964), Photography by Lafayette Ltd. Reproduced with permission of Oxford Health NHS Foundation Trust, Oxfordshire Health Archives, Oxfordshire History Centre and Lafayette Ltd. solely for this Medical History.

On July 20, 1932, Girdlestone (Figure 1) wrote to Sir Robert Jones, about the excellent Platt (Fig. 2)^{7,8,9} who had trained at the Massachusetts General Hospital.

In November 1937, Lord Nuffield gave £26,000 "to develop orthopaedics in Northern Ireland^{5,10}". In addition, Lord Nuffield promised to "Provide for honoraria to help young surgeons specialise in orthopaedic surgery." (Table 1) This announcement was written at Nuffield's request by Girdlestone, now elected Nuffield Professor of Orthopaedics at Oxford University⁵.

The Travelling Surgeons Club (a group of 20 WWI

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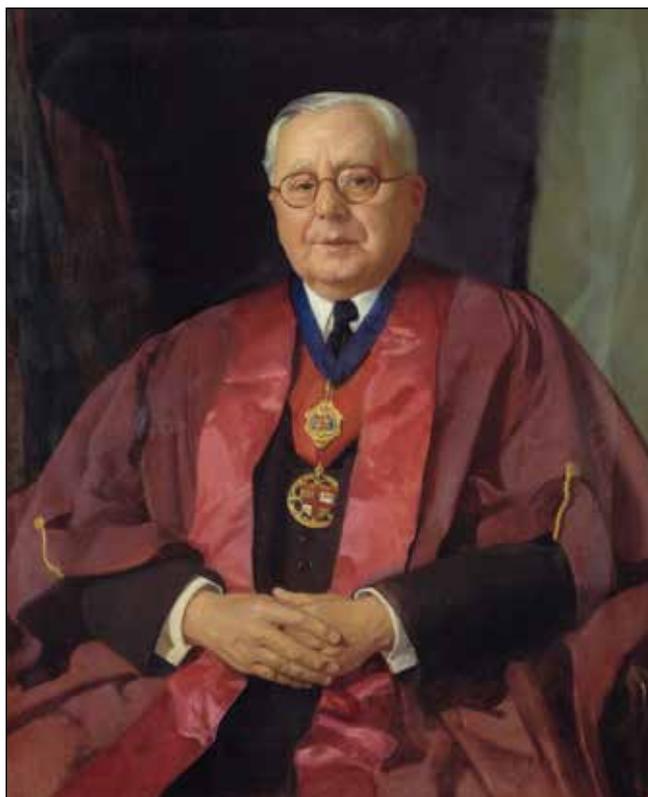


Fig 2. Sir Harry Platt, 1886-1986. Oil on canvas by Sir William Oliphant Hutchison PRSA (1889-1970), 37" x 31.5". Reproduction courtesy of the Hunterian Museum at the Royal College of Surgeons of England and reproduced with their permission solely for this Medical History.

surgeons), along with the Surgical Travellers¹⁴, at their spring 1939 meeting in Belfast suggested that a Northern Ireland Orthopaedic Committee be formed under the Chairmanship of David Lindsay Keir, Vice Chancellor of Queen's University^{14,15} (Fig 3). He read Philosophy and Modern Languages at Glasgow University from where he volunteered for the Royal Scottish Borderers. Wounded twice at the Somme¹⁶ and Arras he became acquainted with Jones's organisation for Allied wounded triage and treatment. Keir completed his undergraduate study at Oxford and was there elected to a fellowship at University College. Called to Harvard for 1923 and 1924 as tutor, he became cognisant of a very strong Orthopaedic Department described by Platt in a panegyric on his Harvard training at the Massachusetts General Hospital⁹. Keir returned to University College, Oxford University to assume Bursarial duties^{17,18,19,20,21,22,23,24}. These responsibilities led to friendship with Sir William Morris, later Lord Nuffield, and Professor Girdlestone, Nuffield Professor of Orthopaedics. Girdlestone, Irish Amateur golf Champion and Oxford golf blue²⁵, enjoyed golfing with W. Rowley Bristow, a Scratch Player, Nuffield Head of Orthopaedics at St. Thomas's Hospital, London and designate of the RAMC²⁶.

KEIR COMMITTEE EXECUTIVE AND PLENARY

Vice Chancellor Keir of Queen's chaired the committee beginning with its first meeting on Monday, March 11, 1940, to discuss a "draft scheme drawn up for Northern Ireland by the Central Council for the Care of Cripples^{15,27}." The Committee's aims were "A. The recognition of orthopaedics

TABLE 1.

Nuffield Orthopaedic Benefactions, 1935-1942^{10,11,12}

DATE	Original Amount	2015 £ equivalent ¹³	Recipient
1935	£275,000	£15,867,500	Nuffield Fund for Cripples
1935	£321,800	£18,567,860	Nuffield Fund for Orthopaedic Services in Australia, New Zealand, and the Union of South Africa
1935	£8,000	£461,600	Radcliffe Infirmary, New Wards
1935	£16,000	£923,200	Nuffield Institute of Medical Research
1936	£10,000	£572,000	Albert Dock Hospital (Fracture Clinic)
1936	£2,000,000	£114,400,000	Medical School Trust
1936	£100,000	£5,720,000	Higher Studies Fund
1937	£300,000	£16,620,000	Oxford Hospitals and Nursing Services
1937	£26,000	£1,440,400	Northern Ireland Allocation
1937	£25,000	£1,385,000	Princess Elizabeth Orthopaedic Hospital, Exeter
1938	£31,380	£1,697,658	Wingfield-Morris Orthopaedic Hospital
1940	£250,000	£11,875,000	Royal Air Force Benevolent Fund
1941	£1000 Nuffield Block Grant authorized	£42,900	Northern Ireland Council for Orthopaedic Development (NICOD)
1942	£2000 requested	£79,800	Request by NICOD for funds for medical training and treatment
TOTAL		£189,652,918	



Fig 3. Sir David Lindsay Keir, LL.D (1895-1973). Oil on canvas, 47" by 33", by Allan Gwynne-Jones, 1960. Reproduced with permission of the Master and Fellows of Balliol College, solely for this Medical History.

as a specialty in the University and B. A central open-air Orthopaedic Hospital for long-stay cases²⁷." The consensus was that both objectives, including the appointment of a full time Orthopaedic Surgeon and Professor of Orthopaedics at Queen's, had to be deferred until defeat of Germany. The creation of regional orthopaedic clinics in Northern Ireland on the Robert Jones model was strongly endorsed and realised with Nuffield money (Table 1). Personnel were sent to Oswestry and Oxford to be trained as Orthopaedic Sisters and technicians. A Northern Irish Orthopaedic instrument and device industry was launched, again²⁸ with Nuffield support^{10,15} (Table 1). Watson-Jones, Civilian Advisor to the Royal Air Force was invited and accepted an invitation to address the Northern Ireland Council for Orthopaedic Development (NICOD) on 11 September 1941^{15,29,30}. The regional directors of the North West England Emergency Medical Service Hospitals were engaged in mutual support in patient transfers. The RAF and U.S. Army Air Force provided NICOD with air transport facilities for patients, medical consultants and needed support staff. Planning was undertaken for the desired entry of the United States into the war. The Executive committee decided that public plenary meetings of NICOD should be chaired by the Duchess of Abercorn, DBE. Northern Irishman, Mr. R Jimmy W Withers, a surgeon of

proven executive ability, should be co-opted as leader and guarantor of the future of orthopaedics in Northern Ireland. Withers had gained first-class honours from Queens in 1930. He was MD Gold Medalist then M.Ch. highly commended. Sir Ian Fraser, the host of the 1939 Surgical Travellers meeting in Belfast of 15 members had successfully proposed Withers as a member for being "the best of good crack". Withers was a Rugby Blue and an excellent golfer: fluent in French and German. He was popular in the "intellectual rugby team" of the Surgical Travellers founded in 1927.^{14,15} Fraser, was thanked for his service on the Executive Committee. Fraser was now surgeon to the Allied Medical Services to the Mediterranean Theatre¹⁴. As a result of this NICOD meeting, there was publicity on Northern Ireland not having another orthopaedic surgeon. This adverse publicity was at least partially countered by my father now working at Musgrave Park³¹, who said that since he had worked as surgeon to the UK Coal Trade since 1936, and Fraser had worked as surgeon at St. Helens, both were experienced in orthopaedics and trauma. Withers, together with Thomas B. Quigley³², and Queen's University were funded by Nuffield to send three potential assistant surgeons for further training at Oxford, Oswestry and Exeter. The RAF (and from June 1942, the U.S. Army Air Force) agreed to fly essentially all patients with combined orthopaedic and neurological injuries to Oxford; Neurosurgery at Saint Hilda's College under Cairns and Calvert. The treatment of Orthopaedic lesions was under the purview of Girdlestone and Joseph Trueta of Spanish Civil War Fame⁵.

Major Quigley, former intern of Harvey Cushing and head of Orthopaedics at Musgrave Park from May to December 1942³², was de facto senior orthopaedic consultant for Northern Ireland. Later, when I worked with him at Harvard, he stated that Belfast was as hard as interning for Harvey Cushing. Quigley pointed out that without more trained and devoted physiotherapists, nurses, occupational therapists and plasterers, return to health and duty was delayed or thwarted³³. Platt (Fig. 2) and Watson-Jones promised better and faster training as an Allied priority^{30,33,34}. Watson-Jones, Civilian Consultant to the RAF and constant visitor to Air Stations, with Sir Archibald Sinclair, Minister of Air in the British Cabinet agreed. With increased training, Air Crew Hospitals, limitation of mandatory tours of duty, results and times of return to flying improved. Osmond-Clarke, also Harvard trained^{1,2} (Fig. 4), on the recommendation of Platt became Air Commodore and Head of Orthopaedics for the RAF.

US DEPLOYMENTS

In January and February 1943, Bristow, as Head of Orthopaedics, RAMC, was sent to the US by Churchill's War Cabinet to advise that U.S. Army deployments of orthopaedic surgeons were not realistic for the invasion of France²⁶. In the Mediterranean, with an Allied Command structure, therapy and evacuation were reasonably satisfactory. Since in France, Medical Services were to be divided, where were

* This and other first-person references refer to the first author.



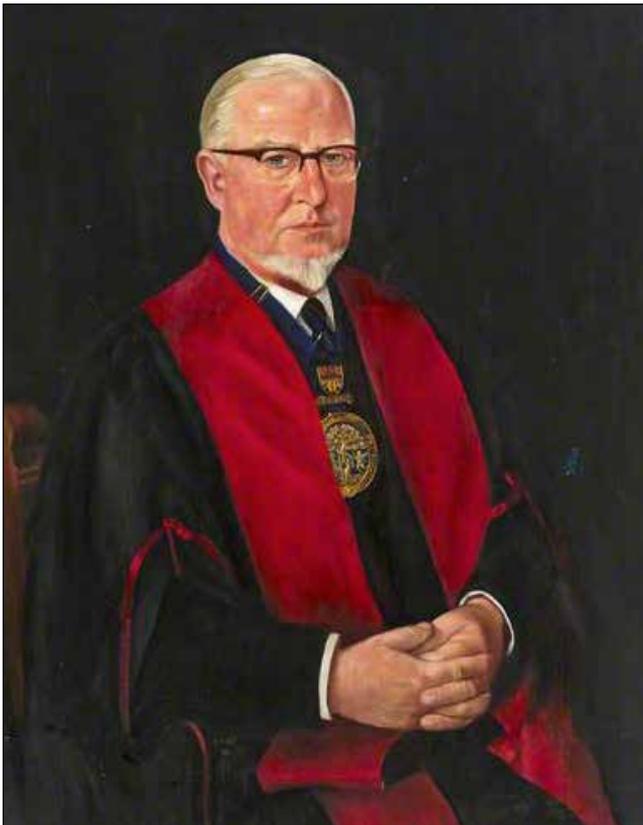


Fig 4. Sir Henry Osmond-Clarke, KCVO, CBE, Portrait, Oil on Canvas, Artist Unknown.

the U.S. orthopaedic plans? Robert Jones who died in 1933, had divulged them to the U.S. before his death, but they were still classified 'Secret'. With 70% of wounds of the Allies having an orthopaedic component^{1,2,35}, this lack of preparation was another reason for no trans-Channel invasion in 1943. Eventually after D-Day, the U.S. orthopaedic surgeons were more rationally deployed³⁶. The American Medical Association achieved their object on June 1, 1943 of getting Kirk, an orthopaedic surgeon who had studied briefly at Johns Hopkins University Hospital, Baltimore and the Massachusetts General Hospital, appointed U.S. Army Surgeon General, after the firing of his Donegal-born predecessor Magee^{36,37}.

U.S. NAVY ORTHOPAEDICS

The U.S. Navy Surgeon General Ross McIntire, had been since 1935, President Franklin D. Roosevelt's personal physician, accompanying him almost everywhere. On the Presidential train his accommodation was in the Communications Car. He flew with FDR and heard from him how "My Navy must have the best"³⁸. Admirals King and Leahy concurred. Joseph Barr, Head of Orthopaedics Designate at the Massachusetts General Hospital was appointed Head of the U.S. Naval Hospital, Bethesda, Maryland, FDR's Hospital (Fig. 5)³⁹. Joe Barr met his friend McIntire frequently and was put in charge of U.S. Navy Medical Deployment. Barr, having pioneered and developed successful disc surgery^{40,41} was famous from 1935. He knew the best orthopaedic and general surgeons. Excellent orthopaedic surgeons were deployed under Nimitz

to the Carrier Battles, Leyte, Iwo Jima, Okinawa and the Kamikaze attacks. These medics helped design and operate the pipeline nitrogen purging systems to quench fires and prevent explosions.

As a consultant (1964-74) to the U.S. Naval Hospital, Boston, I read and taught on the oxygen monitoring devices and their care of the ship-borne wounded and near-drowned. Barr was also appointed head of instruction visuals under FDR as C in C⁴¹. In the 1960s I worked with Barr in the operating rooms of the Massachusetts General Hospital; as Buckminster Brown Professor, he was an excellent and enlightened head of Harvard Orthopaedics.



Fig 5. Joseph S. Barr, oil on canvas, 44" by 33" (framed 50" by 40"), by Pietro Pezzati (1902-1993), 1964³⁹, from the Massachusetts General Hospital, Archives and Special Collections, reproduced with permission of the Paul S. Russell Museum of Medical History.

EVACUATION TO REGIONAL ORTHOPAEDIC CENTRES IN THE UK

While splints, even those improvised on site from sticks, boards and even a soldier's rifle, could be applied in a Battalion Aid Station or in the field, these were temporary measures. It was generally accepted that plaster casts should not be applied until after surgical cleansing of the affected limbs. The inherent difficulties of its use in the field resulted in plaster not being applied until patients had reached the clearing stations and field hospitals^{16,42}. Innovations including the plaster traction splint for compound fractures, improved traction cradles and revolving traction frames resulted from

TABLE 2.

*Cross-channel aeromedical evacuation,
D-Day through May 1945^{44,45}
(70% Of evacuees had orthopaedic injuries)*

MONTH	NO. EVACUATED
June 1944	7,947
July 1944	19,490
Aug. 1944*	29,151
Sept. 1944*	26,126
Oct. 1944*	17,518
Nov 1944*	26,059
Dec 1944*	31,478
Jan 1945*	17,483
Feb 1945*	17,428
March 1945*	44,108
April 1945*	81,701
May 1945*	42,567
TOTAL	361,056
*From 16 August 1944, evacuated represents Allied control under SHAEF ⁴⁵ .	

the combined efforts of U.S. Orthopaedic Surgeons now Lt. Col. Quigley^{32,34}, Maj. Marshall R. Urist and Capt. Lincoln Ries at the 22nd General Hospital in the 802nd Hospital Centre in Blandford, England³⁴.

Ultimate responsibility for the regionalised orthopaedic centres in the UK in the aftermath of D-Day, June 6, 1944, was divided de facto between Air Commodore Osmond-Clarke for the RAF, Colonel Grow for the U.S. Army Air Force, Bristow for the RAMC with Girdlestone responsible for Southern England and Bristow and my father responsible for the North of the UK. Responsibility was aided by Sir Alexander Hood's firm role as Director General, RAMC, and General Paul Howley's much-praised role as Chief U.S. Surgeon for the European Theater of Operations. Watson-Jones held a position similar to that held by Jones in World War I. Ten RAF orthopaedic units of up to 150 beds were created, backed by residential rehabilitation centres: 77 % of these patients were returned to full active RAF duty, while 18

% were retrained or returned to modified duty: only one in twenty needed invalid discharge^{30,43}. By October of 1943, the

U.S. Army had implemented training programs for physical therapists. While occupational therapists were not accorded military status, 96-hour army orientation programs for these professionals were also established at three U.S. locations³³.

These great patient results were due to superb air evacuation and nursing^{44,45} (Table 2). U.S. Army engineers put into operation sixty new airfields and by 15 September 1944 the RAF had built a total of seventy-six airfields⁴⁶. Bristow used to say that steel air strips were among the greatest advances in World War II orthopaedics.

NIGHTINGALES

This appellation is generally applied to nurses who have graduated and stayed to work at St. Thomas's Hospital, London. During World War II "Nightingale" was also applied to U.S. Army Air Force qualified air evacuation nurses and to Princess Mary's Royal Air Force nurses. Groups of Nightingale nurses were collectively superb—the Allied air evacuation in-flight mortality for the European Theatre was almost zero. Princess Mary, also known as the Princess Royal (Fig 6), based her selected World War II 'Mary Nightingales' in Necerne Castle on Lough Erne and in Castle Archdale, Northern Ireland. The Princess Royal also had jurisdiction over 30,000 UK EMS beds—just sufficient for the casualties from Normandy, St Lô, Arnheim, V1 and V2 bombs and the Battle of the Bulge⁴⁸. Close cooperation of British and U.S. Orthopaedic leadership led to excellent results in World War II. Early skilled triage and evacuation are keys to success in warfare^{49,50}. Viscount Nuffield's generosity aided Allied victory in World War II.

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Fig 6. Her Royal Highness, Princess Mary, the Princess Royal CI, GCVO, CBE, RRC (1897-1965), by Sir James Jebusa Shannon (1862-1923), 1914^{44,47}. Princess Mary, The Princess Royal, trained at Great Ormond Street. During World War I she founded the Princess Mary RAF Nurses⁴⁴. During World War II she oversaw expansions of UK Emergency Hospitals⁴⁶; Commandant of the ATS with the rank of General in the British Army.



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